

THE GEOPOLITICAL IMPLICATIONS OF THE UNITED STATES OF AMERICA'S WITHDRAWAL FROM THE PARIS AGREEMENT

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I. INTRODUCTION

Since the dawn of the industrial revolution, humans have been significantly contributing to Earth's carbon dioxide budget. Primitive methods of deforestation and agriculture have rapidly transformed into a society dependent upon the burning of fossil fuels, such as coal, oil and gas, for every activity.¹ Anthropogenic² greenhouse gas emissions, since the pre-industrial era, have driven large increases in the atmospheric concentrations of carbon dioxide, methane and nitrous oxide.³ As a result of human advancement, carbon dioxide levels are higher than at any point in the past 800,000 years.⁴ Carbon dioxide is a greenhouse gas (GHG), in our atmosphere, which traps heat and contributes to the Earth's average surface temperature, a mechanism known as the greenhouse effect.⁵ Scientific data, acquired from ice cores, and dating back over 800 millennia, reveal a tight correlation between increases in temperature and greenhouse gases.⁶

From 1990 to 2012, the United States of America (U.S.) was responsible for about 18 percent of the cumulative global total of greenhouse

¹ Ben Henley, *Thee three-minute story of 800,000 years of climate change wit ha sting in the tail*, THE CONVERSATION (June 12, 2017, 3:57 PM), <https://theconversation.com/the-three-minute-story-of-800-000-years-of-climate-change-with-a-sting-in-the-tail-73368>.

² Oxford, *Anthropogenic*, <https://en.oxforddictionaries.com/definition/anthropogenic> (last visited Nov. 11, 2017) (“chiefly of environmental pollution and pollutants originating in human activity”).

³ *Climate Change 2014 Synthesis Report Summary for Policymakers*, 1, 4 (2014), https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

⁴ Rebecca Lindsey, *Climate Change: Atmospheric Carbon Dioxide*, NOAA (Aug. 30, 2009).

⁵ Henley, *supra* note 1; GLOBAL CLIMATE CHANGE AND U.S. LAW 8 (Jody Freeman & Michael B. Gerrard eds., 2d ed. 2014) (the greenhouse gas effect happens when solar radiation is trapped due to GHGs in the atmosphere. These gases absorb and reradiate some of the heat that otherwise would escape. Thus, the more GHGs in the atmosphere, the more warming).

⁶ *Id.*

gas emissions.⁷ Currently, the U.S. is the world's second largest emitter of carbon dioxide, only behind China.⁸ Within the U.S., the electricity, transportation and industry sectors account for 77 percent of carbon dioxide emissions.⁹ Additionally, about 79 percent of U.S. GHG emissions come from burning fossil fuels.¹⁰ Global climate change¹¹ caused by the emission of GHGs, the most common of which is carbon dioxide, is the most significant global issue facing the world today.¹²

In December 2015, the 21st Conference of Parties (COP)¹³ met in Paris, France to finalize the Paris Agreement (the "Agreement"). Since the United Nations Framework Convention on Climate Change (UNFCCC) came into force, the COP has met annually to review the implementation of legal instruments, and make decisions to promote institutional and administrative agreements.¹⁴ "The [Paris A]greement set...out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2 [degrees Celsius (C)]."¹⁵ Through the use of national determined contributions (NDC), the governments of the world agreed upon the need for global emissions to peak as soon as possible, and to undertake rapid emissions reductions using the best available

⁷ Natural Resources Defense Council, *The Road From Paris: The United States Progress Towards Its Climate Pledge*, 1, 1 (Nov. 2016), <https://www.nrdc.org/sites/default/files/paris-climate-conference-US-IB.pdf>.

⁸ Chan et al., *The Trump Effect: Tracking the impact of the president's policies*, THOMPSON REUTERS (2017), <http://fingfx.thomsonreuters.com/gfx/rngs/TRUMP-EFFECT-ENERGY/010051272EC/index.html#Stories>.

⁹ U.S. Env'tl. Prot. Agency, *Fast Facts*, EPA 1, 1 (Apr. 2017), https://www.epa.gov/sites/production/files/2018-01/documents/fastfacts_20170817-508_1.pdf (major sources of carbon dioxide pollution include, power plants, manufacturing facilities, mining operations, and petroleum-powered vehicles; electricity accounts for 29%; transportation is 27% and; industry is 21%).

¹⁰ GLOBAL CLIMATE CHANGE AND U.S. LAW, *supra* note 5, at 4.

¹¹ Phebe Asantewaa Owusu & Samuel Asumadu-Sarkodie, *A review of renewable energy sources, sustainability issues and climate change mitigation*, COGENT ENG'G 1, 5 (Apr. 2016), <https://www.cogentoa.com/article/10.1080/23311916.2016.1167990.pdf> ("The United Nations Framework Convention on Climate Change defines climate change as being attributed directly or indirectly to human activities that alters the composition of the global atmosphere and which in turn exhibits variability in natural climate observed over comparable time periods.").

¹² T. Jayaraman, *The Paris Agreement on Climate Change: Background, Analysis, and Implications*, 5 REV. OF AGRARIAN STUD. 42, 43 (2015).

¹³ United Nations Framework Convention on Climate Change, *Conference of the Parties*, UNFCCC (2014), <http://unfccc.int/bodies/body/6383.php> ("The [Conference of the Parties] is the supreme decision-making body of the [United Nations Framework Convention on Climate Change.]").

¹⁴ United Nations Framework Convention on Climate Change, *Bodies*, UNFCCC (2014), <http://unfccc.int/bodies/items/6241.php>.

¹⁵ European Commission, *Climate Action*, EUR. COMM'N (Oct. 11, 2017), https://ec.europa.eu/clima/policies/international/negotiations/paris_en.

technology.¹⁶ Furthermore, it was agreed that the Parties would help to improve societies' resiliency, and provide enhanced support to developing countries.¹⁷ Finally, the Parties agreed to rework emissions targets every five years, as science required, and increase transparency by reporting to the public, and other Parties, on implementation and progress.¹⁸ However, while the Intergovernmental Panel on Climate Change has not yet completed their assessment of the feasibility of the international goal to limit warming to 1.5 degrees C,¹⁹ other institutions have determined that even if every country, including the United States, hit their NDCs, the emissions reductions would not be enough to reach the long-term temperature goals.²⁰ In fact, current pledges put the world on track towards a potential warming of 2.7 degrees C.²¹

International and domestic initiatives on anthropogenic climate change are inherently difficult due to the characteristics of greenhouse gases.²² For example, carbon dioxide is a stock pollutant.²³ As a result, once it is released into the atmosphere it disperses globally. Therefore, carbon dioxide released in Beijing, China has the same effect globally as that of equal quantity released in New York, New York. Thus, climate change is not only global problem, but a geopolitical one, as well.²⁴ Climate change is a geopolitical problem for three primary reasons. First, every country emits greenhouse gases, which disperse evenly through the atmosphere; as a result, every country will feel the impacts of climate change to some degree.²⁵ However, climate change is not spatially uniform as countries both emit different quantities of GHGs and will feel different effects of climate change.²⁶ Secondly, the efforts to remedy climate change are global as almost every country is Party to the UNFCCC. Finally, climate change is without

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ See Intergovernmental Panel on Climate Change, *Media reports on draft IPCC Special Report on Global Warming of 1.5°C*, IPCC (June 14, 2018), https://www.ipcc.ch/news_and_events/st_sr15_fgd.shtml.

²⁰ Michiel Schaeffer et al., *Feasibility of limiting warming to below 1.5°C*, CLIMATE ANALYTICS (Nov. 30, 2015), <http://climateanalytics.org/briefings/feasibility-of-limiting-warming-to-below-1-5c.html>.

²¹ *Id.*

²² See *id.* at 9.

²³ *Id.*

²⁴ Jon Barnett, *The Geopolitics of Climate Change*, GEOGRAPHY COMPASS 1361, 1361-1375 (2007).

²⁵ *Id.*

²⁶ *Id.*

borders.²⁷ Climate change is an issue for governments, political groups, non-governmental organizations, the private sector and communities worldwide, as each actor emits greenhouse gases, and must deal with the potential future impacts.²⁸ Thus, climate change has spatial politics.²⁹ This has led countries, and groups to jockey for influence on the global stage, further exacerbating geopolitical tensions.³⁰

Historically, geopolitical³¹ competitions have focused on finite resources, transportation lines, territorial boundaries and access to marine environments.³² However, as the politicization of climate change has intensified, climate change has begun to be used as a new geopolitical tool.³³ Climate change is driving shifts in the geopolitical environment.³⁴ This concept was theorized in a 2010 U.S. Department of Defense Quadrennial Defense Review Report, which concluded “climate change could have significant geopolitical impacts around the world.”³⁵ Thus, just as the U.S. and China have long competed for fossil fuel sources, these two world powers are now competing to incorporate new energy sources into their respective energy mixes.³⁶ While China is still categorized as a developing country under the UNFCCC, from 2000-2010, it passed the U.S. as both the world's largest energy consumer and investor in renewables.³⁷ The effects of energy use by China and the United States are far reaching, impacting the world's markets, economies, environment, public health, and interstate relations.³⁸ However, to date, the level of international cooperation on addressing energy issues has been nonexistent.³⁹ Furthermore, China has not

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.* (spatial politics is the identification of political differences and actions across a particular space).

³⁰ *Id.*

³¹ Oxford, *Geopolitical*, <https://en.oxforddictionaries.com/definition/geopolitical> (last updated Nov. 11, 2017) (“Relating to politics, especially international relations, as influenced by geographical factors.”).

³² Chufu Mou et al., *Assessment of Geopolitical Influence Based on Climate Change*, 7 J. GEOGRAPHY & NAT. DISASTERS 1, 1-6 (2017).

³³ *Id.*

³⁴ *Id.*

³⁵ U.S. DEP’T OF DEFENSE, QUADRENNIAL DEFENSIVE REVIEW REPORT 85 (Feb. 2010).

³⁶ Brye Butler Steeves & Helton Ricardo Ouriques, *Energy Security: China and the United States and the Divergence in Renewable Energy*, SCIELO (May/Aug. 2016), http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-85292016000200643&lng=en&nrm=iso&tlng=en.

³⁷ *Id.*

³⁸ *Id.*

³⁹ *See id.*

made a secret of its goal to be the dominant force in renewable energy.⁴⁰ This should concern the U.S., as China appears to be using climate change as a geopolitical tool in order to advance its own political and economic self-interests.⁴¹

On June 1st, 2017, President Donald J. Trump formally announced that the United States of America was withdrawing from the Paris Agreement. The Administration's withdrawal of the United States from the Agreement has left the United States on shaky grounds internationally.⁴² After the announcement, Germany, France and Italy offered a joint declaration opposing the move by the United States, while countries such as, China and India reaffirmed their commitment to the Paris Agreement.⁴³ Given the uncertainty surrounding the United States' global role fighting climate change, there has been discussion about what the most significant consequence will be. This writing will argue that the most detrimental impact of the Trump Administration's withdrawal of the United States from the Paris Agreement will not be environmental, but rather geopolitical, as China will assume the leadership vacuum in the global transition to clean renewable energy.

President Trump's withdrawal from the Paris Agreement leaves a minimum four-year window in which the United States federal government will not be supporting domestic and international institutions in the global climate change fight. As a result, non-federal U.S. actors such as states, cities, regional climate initiatives, and corporations will have to double their efforts to engage the international community, work domestically to promote clean energy technology and legislation, while simultaneously keep a pathway open for the U.S. to formally re-enter the process at a future date. Finally, in order to live up to the United States' proclaimed status as economic and technological leaders, and challenge China on the global stage, the U.S. private sector must continue to be an innovation leader, and pioneer of technologies, in the fields of electricity storage and transportation.

Part II of this writing reviews the potential impacts of climate change and addresses the viewpoint of climate skeptics. Part III provides background information on the United Nations Framework Convention on Climate Change and tracks the brief involvement of the United States within the Paris Agreement. Further, part III dives into the language of the Paris

⁴⁰ *Id.*

⁴¹ Chufu Mou et al., *supra* note 32.

⁴² See Daniel Boffey et al., *EU to by pass Trump administration after Paris climate agreement pullout*, THE GUARDIAN (June 2, 2017, 8:08 EDT), <https://www.theguardian.com/environment/2017/jun/02/european-leaders-vow-to-keep-fighting-global-warming-despite-us-withdrawal>.

⁴³ *Id.*

Agreement that drives the transfer of technology and funding between parties. Part IV offers a general overview of the current regulatory and legal landscape of the Trump Administration with an eye towards how the administration may be promoting anti-climate change actions. Part V evaluates how effective non-federal actors have been at combating climate change, how the United States has continued to reduce emissions without the help of the federal government, and how the lack of federal leadership has created a situation ripe for a global transition. Part VI addresses how and why China positioned themselves as leaders in the global renewable energy transition. The writing concludes in Part VII, with some suggestions about how the United States could challenge the global rise of China.

II. CLIMATE CHANGE

A. Impacts

Long-term temperature observations have been among the most consistent evidence of a warming Earth.⁴⁴ Between 1901 and 2016, global annual average surface temperatures increased by nearly 2 degrees Fahrenheit (F).⁴⁵ Temperature affects all aspects of human society including, food production, energy, health, environmental resources, and infrastructure.⁴⁶ Earth is currently in a period that is the hottest in the history of modern society, and human activities are the primary cause of the current trends in climate.⁴⁷

As more carbon dioxide is deposited into the atmosphere, anthropogenic climate change will have detrimental impacts worldwide.⁴⁸ A few of these impacts include, changes in freshwater and precipitation patterns, stronger storms,⁴⁹ increased flooding and sea level rise, loss of ecosystem services, and changes in crop yields and human health.⁵⁰ For

⁴⁴ D.J. Wuebbles et al., *Climate Science Special Report*, U.S. GLOB. CHANGE RES. PROGRAM 1, 13 (June 2017), https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf.

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ D.J. Wuebbles et al., *supra* note 44, at 33.

⁴⁸ See Philip J. Landrigan et al., *The Lancet Commission on pollution and health*, THE LANCET (Oct. 19, 2017), [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(17\)32345-0/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)32345-0/fulltext).

⁴⁹ Geert Jan van Oldenborgh et al., *Attribution of extreme rainfall from Hurricane Harvey, August 2017*, 13 ENVIRON. RES. LETT. 1, 10 (2018) (“we have strong evidence that global warming over the last century, primarily caused by anthropogenic greenhouse gas emissions, has increased the intensity of [Hurricane Harvey].”).

⁵⁰ National Aeronautic & Space Administration, *The consequences of climate change*, NASA (Jan. 11, 2018), <https://climate.nasa.gov/effects/>.

example, "Diseases caused by [environmental] pollution were responsible for an estimated 9 million premature deaths in 2015...16 [percent] of all deaths worldwide."⁵¹ As a result, pollution-related diseases account for nearly two percent of total annual health-care costs in high-income countries.⁵² Further, cities are especially vulnerable, as they account for 55 percent of the world's population and 85 percent of global economic activity, which results in high population density and energy consumption.⁵³ In the cities of the United States, the urban heat island⁵⁴ effect results in temperatures up to 7°F higher during the day, and up to 4.5°F higher at night.⁵⁵ Finally, the U.S. Center for Disease Control states that the health effects of climate change include increased respiratory and cardiovascular disease, injuries and deaths related to extreme weather events, changes in flood and water borne illnesses and other infectious diseases, and threats to mental health.⁵⁶

B. *Climate Change Skeptics*

Even in the face of overwhelming evidence, a certain number of scientists, with various disciplines, disagree with the causes of anthropogenic climate change, and have been able to attract enough media attention to sow doubt.⁵⁷ Climate skeptics insist that the current global warming trend is within the planet's normal range.⁵⁸ Furthermore, climate skeptics attack the data. Climate analysts insist that the distribution of weather stations has caused the alarm. They argue that the readings at these weather stations are off because 90 percent of the stations are located on land, while land only makes up 30 percent of the Earth's surface.⁵⁹ Climate skeptics have been able to increase media skepticism on climate change's causes, consequences, and solutions further helping to spur the influence of fossil fuel and heavy

⁵¹ Landrigan, *supra* note 48.

⁵² *Id.*

⁵³ *Id.*

⁵⁴ U.S. Env'tl. Prot. Agency, *Heat Island Effect*, EPA (Sept. 28, 2017), <https://www.epa.gov/heat-islands> ("The term 'heat island' describes built up areas that are hotter than nearby rural areas.").

⁵⁵ D.J. Wuebbles et al., *supra* note 44, at 17.

⁵⁶ Center for Disease Control and Prevention, *Climate Effects on Health*, CDC (July 26, 2017), <https://www.cdc.gov/climateandhealth/effects/default.htm>.

⁵⁷ GLOBAL CLIMATE CHANGE AND U.S. LAW, *supra* note 5, at 5.

⁵⁸ Douglas Perry, *Do climate-change deniers have a point? Here are their key arguments*, THE OREGONIAN (Apr. 6, 2016), http://www.oregonlive.com/today/index.ssf/2016/04/do_climate-change_skeptics_hav.html.

⁵⁹ *Id.*

industry groups.⁶⁰ However, on the whole, the majority of the scientific community wholeheartedly endorses anthropogenic climate change. “Two separate studies (from 2010 and 2013), using different methodologies, concluded that approximately 97 percent of the scientists working on climate research agree that the earth is warming and that greenhouse gas emission are the principal cause.”⁶¹

III. UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The United Nations Framework Convention on Climate Change entered into force in 1994 with the ultimate goal of “stabiliz[ing]...greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”⁶² Over 190 countries, including the U.S., are Parties to the UNFCCC, and the U.S. Senate formally ratified the agreement in 1992.⁶³ Parties are classified as Annex I, II and Non-Annex.⁶⁴

Annex I Parties are industrialized or developed countries that were members of the Organization for Economic Co-operation and Development (OECD) in 1992, or Economies in Transition (EIT).⁶⁵ Annex II Parties consist of OECD members but not EIT Parties.⁶⁶ Annex II Parties are required to provide financial resources and technology to developing countries to help them reduce emissions, and adapt to the adverse effects of climate change.⁶⁷ Finally, Non-Annex Parties are mostly developing countries. The United States, European Union (E.U.) and the United Kingdom are Annex I and II Parties, while China, Brazil, and India are Non-Annex Parties.⁶⁸

⁶⁰ Barnett, *supra* note 24.

⁶¹ GLOBAL CLIMATE CHANGE AND U.S. LAW, *supra* note 5, at 5.

⁶² Statement of the U.S. Chamber of Commerce, *Paris Climate Change Agreement*, 1, 3 (2016), <https://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-114-SY-WState-SEule-20160202.pdf>.

⁶³ *Id.*

⁶⁴ United Nations Framework Convention on Climate Change, *Parties & Observers*, UNFCCC (2014), http://unfccc.int/parties_and_observers/items/2704.php.

⁶⁵ *Id.*

⁶⁶ *Id.*

⁶⁷ *Id.*

⁶⁸ *Id.*; see also United Nations Framework Convention on Climate Change, *Parties to the Convention and Observer States*, UNFCCC (2014), http://unfccc.int/parties_and_observers/parties/items/2352.php.

A. *The Paris Agreement*

The Paris Climate Agreement is intended to be a global solution to anthropogenic climate change, and does not replace the UNFCCC, but rather complements it. The Agreement roughly breaks down into two parts: (1) legally binding aspects, and (2) specifics on implementation. Overall, “the...[Agreement] seeks to limit the increase in...global average temperature to well below 2 degrees [C] above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees [C] above pre-industrial levels, recognizing that those would significantly reduce the risks and impacts of climate change.”⁶⁹ Critical to the implementation of the Agreement are broad mechanisms, such as, mitigation, international carbon markets, adaptation, technology development and transfer, and capacity building.⁷⁰ The Agreement formally entered into force on November 4th, 2016, which was the date that 55 Parties to the Convention, accounting for at least 55% of the total global GHG emissions, submitted their instruments for approval.⁷¹ As of this writing, 172 countries have ratified the Paris Agreement, including, and most recently, war-torn Syria.⁷²

1. The United States and Paris

For a total of 209 days, the U.S. was formally a party to the Paris Agreement. In November 2016, then President Barack Obama used an executive agreement within the scope of his executive power to formally join the Agreement on behalf of the United States.⁷³ While a Party, the U.S. formally submitted a national determined contribution. The U.S. proposed to “reduce economy-wide GHG emissions by 26 percent below 2005 levels by 2025 and to make best efforts to reduce emissions by 28 percent.”⁷⁴ At the time, this was thought to be an ambitious but achievable goal.⁷⁵

⁶⁹ United Nations Framework Convention on Climate Change, *Adoption Of The Paris Agreement*, FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

⁷⁰ Statement of the U.S. Chamber of Commerce, *supra* note 62, at 5.

⁷¹ United Nations Framework Convention on Climate Change, *The Paris Agreement*, UNFCCC (2014), http://unfccc.int/paris_agreement/items/9485.php.

⁷² *Id.*

⁷³ STEPHEN P. MULLIGAN, CONG. RESEARCH SERV., R44761, WITHDRAWAL FROM INTERNATIONAL AGREEMENTS: LEGAL FRAMEWORK, THE PARIS AGREEMENT, AND THE IRAN NUCLEAR AGREEMENT 16 (2017).

⁷⁴ United Nations Framework Convention on Climate Change, *United States Nationally Determined Contribution*, UNFCCC 1, 1, <http://www4.unfccc.int/ndcregistry/PublishedDocuments/United%20States%20of%20America%20First/U.S.A.%20First%20NDC%20Submission.pdf> (last visited Feb. 3, 2018).

⁷⁵ *Id.*

2. The Text of the Paris Agreement

The Agreement is focused around a general purpose, which breaks down into three specific, non-exclusive prongs: (1) Staying below 2 degrees C; (2) increasing adaptability (adaptation) and; (3) increasing financial flows for low emissions and climate-resilient development (mitigation).⁷⁶ Climate change mitigation centers on reducing emissions of greenhouse gases in the atmosphere.⁷⁷ Within the Agreement, Article 4 details the mitigation obligation of the non-binding national determined contributions.⁷⁸ NDCs are climate actions plans, which set out a party's mitigation intentions over a certain timeframe.⁷⁹

Adaptation is generally defined as society's acclamation to unavoidable climate changes.⁸⁰ Adaptation and resilience are mentioned as one of the three goals in Article 2.⁸¹ While adaptation may be included in NDCs, Parties are not obligated to do so.⁸² However, Parties are encouraged to develop and share information to improve adaptive capacity, with a specific focus on developing countries.⁸³ The Agreement sets out to find a balance between financial resources allocated to mitigation and adaptation.⁸⁴

While the Agreement does not explicitly mention "markets" or "market mechanisms," it does create three different types of international cooperation on mitigation and adaptation.⁸⁵ (1) Cooperative approaches, which allow parties to engage in bi or multilateral agreements, and could lead to the linking of emission trading schemes;⁸⁶ (2) sustainable development mechanisms and; (3) non-market approaches.⁸⁷ Furthermore, the Agreement

⁷⁶ Bodle et al., *The Paris Agreement: Analysis, Assessment and Outlook*, FED. MINISTRY FOR THE ENV'T, NATURE CONSERVATION, BLDG. AND NUCLEAR SAFETY 1, 7 (Jan. 28, 2016), https://www.ecologic.eu/sites/files/event/2016/ecologic_institute_2016_paris_agreement_assessment.pdf.

⁷⁷ National Aeronautics & Space Administration, *Responding to Climate Change*, NASA (Jan. 26, 2018), <https://climate.nasa.gov/solutions/adaptation-mitigation/>.

⁷⁸ Bodle et al., *supra* note 75, at 8; United Nations Framework Convention on Climate Change, *Paris Agreement*, Articles 4.2, 4.12, ¶ 22, 29, FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

⁷⁹ *Id.*

⁸⁰ National Aeronautic & Space Administration, *supra* note 77.

⁸¹ Bode et al., *supra* note 76, at 11.

⁸² *Id.*

⁸³ Statement of the U.S. Chamber of Commerce, *supra* note 62, at 6.

⁸⁴ *Id.*

⁸⁵ *Id.* at 19.

⁸⁶ *Id.*; United Nations Framework Convention on Climate Change, *Paris Agreement*, Articles 6.2-6.3, ¶ 37, FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

⁸⁷ Statement of the U.S. Chamber of Commerce, *supra* note 61, at 19-20; United Nations Framework Convention on Climate Change, *Paris Agreement*, Articles 6.4-6.9, ¶ 38-41, FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

recognizes the importance of technology development and transfer.⁸⁸ Articles 10, 13.9 and 13.10 establish a technology framework for the Agreement.⁸⁹ “The [Agreement] specifies that the framework should facilitate technology needs assessments, enhanced support and assess which technologies ‘are ready for transfer.’”⁹⁰ Additionally, there is an obligation to improve cooperative development and innovation.⁹¹ Thinking holistically, the Paris Agreement is written with an eye towards facilitating the use of mitigation and adaptation technologies such as renewable energy, and transferring technology and funding between Parties.⁹² The use of renewable energy is the prime choice for enhancing access to affordable, reliable and cleaner sources of modern energy services. More than 170 countries have established renewable energy targets, and nearly 150 have enacted policies to catalyze investment in renewable energy technologies.⁹³

3. Mechanisms for Withdrawal from the Paris Agreement

Article 28 of the Paris Agreement controls the mechanisms for Party withdrawal.⁹⁴ “At any time after three years from the date on which this Agreement has entered into force for a Party, that Party may withdraw from this Agreement by giving written notification to the Depository.”⁹⁵ Nikki R. Haley, acting in her capacity as Representative of the United States of America to the United Nations, informed the Secretary-General of the United Nations that the U.S. planned to withdraw from the Agreement on August 4th, 2017.⁹⁶ However, Article 28(2) continues to explain that withdrawal from the Agreement will formally take effect one year from the date of receipt by the Depository.⁹⁷ In layman’s terms, any withdrawal from the

⁸⁸ Statement of the U.S. Chamber of Commerce, *supra* note 62, at 7.

⁸⁹ *Id.* at 20.

⁹⁰ *Id.*

⁹¹ *Id.*; United Nations Framework Convention on Climate Change, *Paris Agreement*, Articles 10, 13.9 & 13.10, ¶ 66-71, FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

⁹² See United Nations Framework Convention on Climate Change, *Adoption Of The Paris Agreement*, FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

⁹³ International Renewable Energy Agency, *REthinking Energy 2017*, IRENA 1, 9 (2017), http://www.irena.org/DocumentDownloads/Publications/IRENA_REthinking_Energy_2017.pdf.

⁹⁴ United Nations Framework Convention on Climate Change, *Paris Agreement*, Article 28, FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

⁹⁵ *Id.*

⁹⁶ Paris Agreement, United States of America: Communication, Letter dated Aug. 4 2006 from Representative of the United States of American to the United Nations addressed to the Secretary-General, C.N.646.2017.TREATIES-XXVII.7.d (Aug. 4, 2017).

⁹⁷ United Nations Framework Convention on Climate Change, *Paris Agreement*, Article 28, FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

Paris Agreement effectively has a one-year waiting period.⁹⁸ Taking Article 28 together, the United States of America will have to wait four years from the day the Agreement entered into force, November 4th, 2016, for the withdrawal to become official. The U.S. will officially no longer be a party to the Paris Agreement on November 4th, 2020, which ironically is the day after the United States presidential election of 2020.

B. Executive Authority to Withdraw from the Paris Agreement

President Trump was well within his executive authority to withdraw the United States from the Paris Agreement.⁹⁹ The President is the “sole organ” of the U.S. in its external relations, and its lone representative with foreign nations.¹⁰⁰ Under domestic law, it is generally understood that the President, as “sole organ” of the government charged with communicating with foreign states, is the mouthpiece of the U.S. in regards to international agreements.¹⁰¹ Based on precedent, it is accepted that the President may enter into and also terminate executive agreements without congressional or senatorial approval.¹⁰² As a result, “when the Constitution affords the President authority to enter into sole executive agreements, the President may also unilaterally terminate those agreements.”¹⁰³

IV. CURRENT UNITED STATES FEDERAL LANDSCAPE

A. Regulatory Environment

President Trump has so far worked towards keeping his campaign promises of restoring America’s coal industry, and shrinking the federal government’s regulatory footprint.¹⁰⁴ As of this writing, President Trump’s most recent budget proposal included an overall reduction of more than 23 percent from the annual budget of the Environmental Protection Agency

⁹⁸ *Id.*

⁹⁹ See CONGRESSIONAL RESEARCH SERVICE, TREATIES AND OTHER INTERNATIONAL AGREEMENTS: THE ROLE OF THE UNITED STATE SENATE, S. Rept. 192-206 (2001).

¹⁰⁰ *United States v. Curtiss-Wright Export Corp.*, 299 U.S. 304, 319 (1936).

¹⁰¹ STEPHEN P. MULLIGAN, CONG. RESEARCH SERV., R44761, WITHDRAWAL FROM INTERNATIONAL AGREEMENTS: LEGAL FRAMEWORK, THE PARIS AGREEMENT, AND THE IRAN NUCLEAR AGREEMENT 5 (2017).

¹⁰² *Id.* at 6.

¹⁰³ *Id.*

¹⁰⁴ Chan et al., *The Trump Effect: Tracking the impact of the president’s policies*, THOMPSON REUTERS (2017), <http://fingfx.thomsonreuters.com/gfx/rngs/TRUMP-EFFECT-ENERGY/010051272EC/index.html#Stories>.

(EPA).¹⁰⁵ This latest budget proposal threatens to continue to shrink the size and effectiveness of the EPA, which is now at a staffing level that rivals the Regan-era.¹⁰⁶ As a result, the heavy lifting of environmental protection will seemingly be left to the states.¹⁰⁷ Furthermore, in March 2017, President Trump signed an executive order “Promoting Energy Independence and Economic Growth.”¹⁰⁸ This executive order targeted many of the Obama-era climate change regulations including President Obama’s signature Clean Power Plan (CPP).¹⁰⁹ In October 2017, the EPA followed up President Trump’s executive order with a formal proposed rule to repeal the CPP.

1. United States International Trade Commission

On October 31st, 2017, the United States International Trade Commission (USITC) finalized their recommendations for restricting solar cell and panel imports, at the request of two U.S. Solar Companies.¹¹⁰ The two companies contended that they were forced into bankruptcy due to a flood of subsidized imports from China.¹¹¹ As a result, they brought a solar case in front of the trade commission.¹¹² Section 201 of the Trade Act of 1974, also known as the “global safeguard investigation,” gives the President broad authority to impose restrictions to protect domestic industry.¹¹³ Under section 201, domestic industries seriously injured or threatened with serious injury by increased imports may petition the USITC for relief.¹¹⁴ In making an affirmative determination, the USITC recommended protections, which

¹⁰⁵ Brady Dennis, *Trump budget seeks 23 percent cut at EPA, eliminating dozens of programs*, THE WASHINGTON POST: ENERGY AND ENVIRONMENT (Feb. 12, 2018), https://www.washingtonpost.com/news/energy-environment/wp/2018/02/12/trump-budget-seeks-23-percent-cut-at-epa-would-eliminate-dozens-of-programs/?noredirect=on&utm_term=.6bddef1cad25.

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

¹⁰⁸ Donald J. Trump, *Presidential Executive Order on Promoting Energy Independence and Economic Growth*, THE WHITE HOUSE (Mar. 28, 2017), <https://www.whitehouse.gov/the-press-office/2017/03/28/presidential-executive-order-promoting-energy-independence-and-economy-1>.

¹⁰⁹ *Id.*

¹¹⁰ David Lawder & Diane Bartz, *U.S. Trade Panel Recommends Varying Solar Panel Imports*, THOMPSON REUTERS (Oct. 31, 2017, 11:54AM), <http://www.reuters.com/article/us-usa-trade-solar/u-s-trade-panel-recommends-varying-solar-panel-import-restrictions-idUSKBN1D027L>; Ana Swanson, *To Protect U.S. Solar Manufacturing, Trade Body Recommends Limits on Imports*, N.Y. TIMES (Oct. 31, 2017), <https://www.nytimes.com/2017/10/31/business/solar-industry-import-tariffs.html>.

¹¹¹ Lawder & Bartz, *supra* note 110.

¹¹² *Id.*

¹¹³ Trade Act of 1974, 19 U.S.C. § 2251 (2016).

¹¹⁴ U.S. International Trade Commission, *Understanding Safeguard Investigations*, https://www.usitc.gov/press_room/us_safeguard.htm, (last visited Nov. 8, 2017).

ranged from limiting imports of certain solar technology to imposing a tariff in the range of 10-35 percent.¹¹⁵ However, the recommendations have been met with mixed reactions.

While the recommendations have been championed by American solar producers, utility companies, and home solar installers, other solar industry participants are concerned that such measures would raise prices throughout the supply chain, cost more American jobs than it would create, and undermine the move towards competitive renewable energy.¹¹⁶ The top U.S. solar trade group, the Solar Energy Industries Association, even went so far as to call any tariff “intensely harmful to the industry.”¹¹⁷ However, on January 22nd, 2018, President Trump approved the recommendations of the USITC and imposed a tariff of 30 percent in the first year, 25 percent in the second year, 20 percent in the third year, and 15 percent in the fourth year.¹¹⁸ In actuality, imposing a tariff on imported solar modules might actually help Chinese companies, which have been subject to tariffs since 2012.¹¹⁹ In approving a new universal set of duties, it may actually allow Chinese solar companies to gain a competitive advantage, as other international solar companies had previously not been subject to tariffs.¹²⁰

B. Legal Environment

The rapid-fire directive to erase President Obama’s environmental legacy has been met with resistance from the courts.¹²¹ On October 4th, 2017, U.S. Magistrate Judge Elizabeth D. Laporte, in Northern California, vacated a decision by the Department of Interior (DOI) to delay compliance with

¹¹⁵ Ana Swanson, *To Protect U.S. Solar Manufacturing, Trade Body Recommends Limits on Imports*, N.Y. TIMES (Oct. 31, 2017), <https://www.nytimes.com/2017/10/31/business/solar-industry-import-tariffs.html>.

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ Office of the U.S. Trade Representative, *President Trump Approves Relief for U.S. Washing Machine and Solar Cell Manufacturers*, EXECUTIVE OFFICE OF THE PRESIDENT (Jan. 22, 2018), <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/january/president-trump-approves-relief-us>.

¹¹⁹ David Blackmon, *Solar Tariff Case Challenges President Trump’s ‘Energy Dominance’ Agenda*, FORBES: ENERGY (Sept. 20, 2017, 11:23am), <https://www.forbes.com/forbes/welcome/?toURL=https://www.forbes.com/sites/davidblackmon/2017/09/20/solar-tariff-case-challenges-president-trumps-energy-dominance-agenda/&refURL=https://www.google.com/&referrer=https://www.google.com>.

¹²⁰ *Id.*

¹²¹ Eric Lipton, *Courts Thwart Administration’s Efforts to Rescind Obama-Era Environmental Regulations*, N.Y. TIMES: CLIMATE (Oct. 6, 2017), https://www.nytimes.com/2017/10/06/climate/trump-administration-environmental-regulations.html?_r=0.

methane flaring laws, which regulated the waste of natural gas from venting and leaking during oil and natural gas production on Federal leases.¹²²

DOI had issued a notice in the Federal Register that it was postponing compliance dates for certain sections of the Waste Prevention, Production Subject to Royalties, and Resource Conservation Rule (the “Rule”).¹²³ The postponed sections were subject to a compliance date of January 17th, 2018.¹²⁴ DOI was compelled to suspend compliance dates under Executive Order No. 13783, which instructed each executive agency to identify actions that “potentially burden the development or use of domestically produced energy resources and appropriately suspect, revise or rescind [them].”¹²⁵ Further, the DOI determined that postponing the compliance dates would most effectively preserve the status quo while it undertook a departmental review.¹²⁶ Using Section 705 of the Administrative Procedures Act (APA), the DOI determined that postponement was appropriate in light of the substantial costs and the uncertain regulatory future.¹²⁷

Judge Laporte vacated the postponement notice because the DOI violated the APA.¹²⁸ First, the DOI exceeded their power under the APA when it issued the postponement notice.¹²⁹ Section 705 of the APA allows for the postponement of certain parts of the Rule, but not its entirety, if done so before the effective date. However, DOI failed to do so.¹³⁰ Secondly, DOI failed to follow the APA’s notice-and-comment requirement by repealing the Rule without engaging in the public comment process.¹³¹ Finally, the postponement notice was arbitrary and capricious because DOI failed to incorporate the benefits that would arise from compliance.¹³² The decision by Judge Laporte was the third time since July 2017 that the EPA or another federal agency has been found to have acted illegally in their efforts to roll back environmental rules. However, this particular legal battle is far from over as the Bureau of Land Management filed a Notice of Appeal on December 4th, 2017.¹³³ While the Trump administration remains confident

¹²² *California v. United States Bureau of Land Management*, No. 3:17-cv-03804-EDL (N.D. Cal. 2017) (order granting motion for summary judgment).

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ *Id.*

¹³² *Id.*

¹³³ *California v. United States Bureau of Land Management*, No. 3:17-cv-03804-EDL (N.D. Cal. 2017) (notice of appeal).

in its legal positions, legal scholars believe that the Administration's haste is inviting further legal challenges.¹³⁴ However, even with legal setbacks, the list of environmental rules that have been reversed is considerable, including, unfreezing federal coal leases and offshore drilling in the Atlantic and Arctic Oceans, and lifting mining restrictions in Alaska.¹³⁵

The Clean Power Plan was the centerpiece of the Obama-era climate regulation. Through the use of Section 111 of the Clean Air Act (CAA), the "plan [was] designed to cut carbon pollution from the electricity sector by 32 percent over 2005 levels by 2030."¹³⁶ The EPA, under the Obama Administration, calculated that by 2030 the CPP would prevent nearly 100,000 asthma attacks and over 3,500 premature deaths, annually.¹³⁷ However, after industry participants and coal-centric States filed lawsuits, the Supreme Court, in February 2016, halted the regulation until an appeals court could review the CPP.¹³⁸ A significant part of the U.S.'s NDC, the CPP was predicted to achieve about a third of the reductions needed to meet the Paris target.¹³⁹ The Trump Administration, in scraping the CPP, will increase the gap the U.S. will face in order to meet the Paris Agreement by an additional 8.1 percent.¹⁴⁰ As a result, other U.S. actors now need to reduce emissions by "11.7 [percent] from 2005 levels" to satisfy the Agreement.¹⁴¹

1. *Juliana v. United States*

Juliana v. United States is a case at the forefront of climate change litigation in the U.S., and recently survived a motion to dismiss for failure to state a claim.¹⁴² This lawsuit features, as plaintiffs, a group of young people between the ages of eight and nineteen who are suing, defendants, the United States of America, President Barack Obama, and numerous executive agencies.¹⁴³ Plaintiffs allege that defendants have known for more than fifty

¹³⁴ Lipton, *supra* note 121.

¹³⁵ *Id.*

¹³⁶ Myanna Dellinger, *Trump, Climate Change Law, and Global Market Needs*, N.Y.U. JBL ONLINE (Feb. 15, 2017), <https://www.nyujlb.org/single-post/2017/02/15/Trump-Climate-Change-Law-and-Global-Market-Needs>.

¹³⁷ Matthew Daly, *EPA to ease emission restrictions on coal-fired power plants*, THOMPSON REUTERS (Oct. 7, 2017), https://www.apnews.com/30a24683a339414a9d9f40597f5753fe?utm_campaign=SocialFlow&utm_source=Twitter&utm_medium=AP.

¹³⁸ *Chamber of Commerce, et al. v. EPA, et al.*, No. 15A787 (U.S. 2016) (order in pending case).

¹³⁹ *Id.*

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *Juliana v. United States*, 217 F. Supp.3d 1224 (D. Or. 2016).

years that carbon dioxide produced by burning fossil fuels was changing the climate system in a way that would “significantly endanger plaintiffs, with the damage persisting for millennia.”¹⁴⁴ Plaintiffs, bringing a substantive due process challenge, and claim under the public trust doctrine, seek (1) a declaration from the court that their constitutional and public trust rights have been violated, and (2) a court order prohibiting defendants from violating those rights and a direction to defendants to develop a plan to reduce carbon dioxide emissions.¹⁴⁵ Judge Akin determined that plaintiffs’ public trust claims were properly categorized as substantive due process claims.¹⁴⁶

Plaintiffs’ contend that the defendants violated their due process rights.¹⁴⁷ In making the claim, plaintiffs argued that the defendants played a central role in the creation of current climate change; that they contributed with “full knowledge of the significant and unreasonable risks” that climate change posed; and that the due process clause, through the danger creation exception,¹⁴⁸ imposes a special duty on defendants to use their authority to regulate GHGs.¹⁴⁹ The court was bound to accept the factual allegations in the complaint as true, and therefore allowed the substantive due process claim to proceed.¹⁵⁰

The second claim was that defendants violated the public trust doctrine. Developed from the common law of property, the public trust doctrine has long been used to ensure that the government is actively protecting natural resources, which are necessary for public welfare.¹⁵¹ At the core of the public trust doctrine, is the legal principle that every government holds natural resources in a “trust¹⁵²” for present and future generations.¹⁵³ Plaintiffs argued that defendants violated their duties as trustees by failing to protect the atmosphere, water, seas, coast, and fauna.¹⁵⁴ Judge Akin ruled that the

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ *Id.* (“The ‘danger creation’ exception permits a substantive due process claim when government conduct ‘places a person in peril in deliberate indifference to their safety.’”); *DeShaney v. Winnebago Cnty. Dep’t of Soc. Servs.*, 489 U.S. 189, 196 (1989).

¹⁴⁹ *Juliana v. United States*, 217 F. Supp.3d 1224 (D. Or. 2016).

¹⁵⁰ *Id.*

¹⁵¹ Mary Christina Wood, *Advancing the Sovereign Trust of Government to Safeguard the Environment for Present and Future Generations (Part I): Ecological Realism and the Need for a Paradigm Shift*, 39 ENVTL. L. 43 (2009)

¹⁵² *Id.* (“A trust is a basic type of ownership whereby one manages property for the benefit of another.”).

¹⁵³ *Id.*

¹⁵⁴ *Juliana v. United States*, 217 F. Supp.3d 1224 (D. Or. 2016).

public trust doctrine is applicable to the federal government. Since the government holds title to “submerged lands between three and twelve miles from the coastlines of the United States,” and a number of plaintiff injuries were related to climate change impacts on the ocean, adequate harm to public trust assets was alleged.¹⁵⁵

V. GREENHOUSE GAS REDUCTIONS WITHOUT THE FEDERAL GOVERNMENT

A. *Without Support from the Federal Government, is All Hope Lost?*

While President Trump’s decision to withdraw from the Paris Agreement has alarmed many, it will prove impossible to derail the U.S.’s move towards curbing emissions because too many non-federal government actors are already substantially invested.¹⁵⁶ Over the past decade, Congress has not passed a single bill that directly combats climate change. Still, the U.S. has led the world in reducing emissions.¹⁵⁷ The traditional view regarding the trade-offs between decarbonisation and economic growth are no longer true.¹⁵⁸ Today, more and more large companies see sustainability as critical to their business model.¹⁵⁹ For large conglomerates, such as, Apple, Facebook, Google and General Electric, energy is just another business expense. Due to the decreasing cost of renewables, the move to cleaner energy is more than a public relations decision it is a cost-saving strategy.¹⁶⁰ By reducing GHG emissions, businesses are saving money, building their brand, and attracting consumers that want to buy from sustainable businesses.¹⁶¹ It comes as no surprise that many of the climate change leaders in business are domiciled in forward-thinking states and cities.¹⁶² Historically, cities and states have played an active role in

¹⁵⁵ *Id.*

¹⁵⁶ Issie Lapowsky, *Even Without Paris, Business Will Leave Trump Behind on Climate Change*, WIRED: BUSINESS (June 1, 2017, 3:48pm), <https://www.wired.com/2017/06/even-without-paris-business-will-leave-trump-behind-climate-change/>.

¹⁵⁷ Michael Bloomberg, *Washington Won’t Have Last Word on Climate Change*, BLOOMBERG OPINION: CLIMATE CHANGE (Nov. 22, 2016, 1:13 PM), <https://www.bloomberg.com/view/articles/2016-11-22/washington-won-t-have-last-word-on-climate-change>.

¹⁵⁸ International Renewable Energy Agency, *REthinking Energy 2017*, IRENA 1, 104 (2017), http://www.irena.org/DocumentDownloads/Publications/IRENA_REthinking_Energy_2017.pdf.

¹⁵⁹ Lapowsky, *supra* note 156.

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² *Id.*

combating climate change, and today, this role is only expanding.¹⁶³ As of this writing, 14 states, one territory, and over 350 cities have pledged to stay true to America's NDCs under the Paris Agreement.¹⁶⁴

By 2014, U.S. net emissions were nine percent below 2005 levels.¹⁶⁵ Generally speaking, the emissions decline was due to a number of market and policy-related factors, such as, the electric power sectors shift to natural gas, and the increased use of renewable energy.¹⁶⁶ Additionally, improved vehicle efficiency has helped to reduce transportation-related emissions.¹⁶⁷ However, the primary reason for the emissions reduction was the role of U.S. actors outside of the federal government.¹⁶⁸ The success of the United States in combating climate change has never been solely dependent on the federal government.¹⁶⁹

B. Market Mechanisms

1. The Natural Gas Boom

Natural gas¹⁷⁰ plays a large role in the U.S. economy, constituting 33 percent of total U.S. energy production in 2016.¹⁷¹ When combusted in modern power plants, natural gas can emit up to 60 percent less carbon dioxide than emissions from a new coal plant.¹⁷² Additionally, natural gas can emit up to 20 percent less GHGs than gasoline when used in today's

¹⁶³ Thomas Forman, *The Role of Cities and States in Combating Climate Change*, GEO. ENV'T L. REV. (Jan. 31, 2017), <https://gehr.org/2017/01/31/the-role-of-cities-and-states-in-combating-climate-change/>.

¹⁶⁴ Timothy Luetkemeyer, *Fighting Climate Change In Post-Paris Agreement America: Reducing Livestock Emissions*, DENV. L. REV. (Aug. 9, 2017), <http://www.denverlawreview.org/dlr-onlinearticle/2017/8/9/fighting-climate-change-in-post-paris-agreement-america-redu.html>.

¹⁶⁵ Doug Vine, *Achieving the United States' Intended Nationally Determined Contribution*, CTR. FOR CLIMATE AND ENERGY SCI. 1, 1 (2016), <https://www.c2es.org/site/assets/uploads/2016/09/achieving-us-indc-nov-2016.pdf>.

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ *Id.* at 1-5.

¹⁶⁹ Bloomberg, *supra* note 157.

¹⁷⁰ Center for Climate and Energy Solutions, *Leveraging Natural Gas To Reduce Greenhouse Gas Emissions*, C2ES 1, 3 (2013), <https://www.c2es.org/site/assets/uploads/2013/06/leveraging-natural-gas-reduce-ghg-emissions.pdf> ("Natural gas is a naturally occurring fossil fuel consisting primarily of methane that is extracted with small amounts of impurities, including [carbon dioxide], hazardous air pollutants, and volatile organic compounds.").

¹⁷¹ U.S. Energy Information Administration, *U.S. Energy Facts Explained*, EIA (May 19, 2017), https://www.eia.gov/energyexplained/?page=us_energy_home#tab1 (petroleum accounted for 28% of total U.S. energy consumption in 2016).

¹⁷² *Id.*

cars.¹⁷³ Due to recent technological advances, the U.S. has seen a boom in natural gas production, which has significantly increased opportunities to help address global climate change in the near to medium future.¹⁷⁴

Recent technological advances in seismic imaging, horizontal drilling,¹⁷⁵ and hydraulic fracturing¹⁷⁶ have allowed for natural gas extraction from unconventional sources.¹⁷⁷ Since 2009, the United States has been the world's leading natural gas producer.¹⁷⁸ The ample supply of natural gas has created a national surplus and thus the U.S. natural gas market has seen low prices and increased stability.¹⁷⁹ Within the U.S., natural gas is used for residential and commercial heating, electricity production and as feedstock.¹⁸⁰ In the near-to mid-term, natural gas will need to continue to serve as a replacement to coal and petroleum in the power, industry and transportation sectors.¹⁸¹ However, as natural gas is a fossil fuel, the expansion cannot be the sole basis for long-term U.S. efforts to address climate change.¹⁸²

2. Natural Gas Transition

In order to successfully meet the United States formally stated NDCs under the Paris Agreement, natural gas will have to take the market share from other primary fuels, such as, coal in the power sector, petroleum in the transportation sector, and fuel oil in the commercial and residential sectors.¹⁸³ The transition to natural gas has been driven by: (1) its flexible use across many sectors, (2) its lower emissions per unit of energy than coal and petroleum, and (3) its domestic production meets all of the United States' annual energy consumption needs.¹⁸⁴ Additionally, in 2009, natural gas and petroleum prices started to diverge, as oil supplies remained tight, and

¹⁷³ *Id.*

¹⁷⁴ Center for Climate and Energy Solutions, *supra* note 170, at 86.

¹⁷⁵ *Id.* at 4 (“Wells are drilled vertically and then turned horizontally to run within shale formations.”).

¹⁷⁶ *Id.* (hydraulic fracking occurs when “a slurry of sand, water, and chemicals is injected into [a] well to increase pressure, break apart the shale to increase permeability, and release the natural gas.”).

¹⁷⁷ *Id.*

¹⁷⁸ *Id.* at 6.

¹⁷⁹ *Id.*

¹⁸⁰ *Id.* at 7.

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ *Id.* at 17.

¹⁸⁴ *Id.* at 11.

natural gas production increased.¹⁸⁵ As a result, “natural costs approximately \$2/MMBTU¹⁸⁶ today, whereas petroleum costs \$18/MMBTU.”¹⁸⁷ However, there is still a tension in the natural gas market between whether higher or lower natural gas prices are better for the environment.

The first school of thought is that higher natural gas prices have significant environmental benefits because they allow for renewable energy to be more competitive and thus achieve market penetration.¹⁸⁸ This reduces consumption overall and spurs growth in new energy technologies.¹⁸⁹ However, inexpensive natural gas prices also have significant environmental benefits by displacing coal in the power sector.¹⁹⁰ As coal prices remain high, natural gas has become more cost-effective as a fuel source for utility companies.¹⁹¹ Consequently, low natural gas prices facilitate a market shift from coal and therefore achieve substantial environmental benefits.¹⁹² Given that potential GHGs emission reductions are most significant in the power industry, low natural gas prices are preferred for the short to mid-term future.¹⁹³ This type of successful transition was witnessed in Mexico. As natural gas prices decreased due to the American shale boom, Mexico began to import as much cheap gas as possible to replace its dirty fossil fuels with cleaner burning natural gas.¹⁹⁴ As a result, more than 25 percent of the country’s electricity is powered by American natural gas.¹⁹⁵ Further, natural gas imports have helped to improve air quality, reduce GHGs in order to meet its Paris obligations, and freed capital to invest in other markets.¹⁹⁶

185 *Id.* at 13.

186 IndexMundi, *MMBTU*, <https://www.indexmundi.com/commodities/glossary/mmbtu> (last visited Jan. 16, 2018) (MMBTU is a measure of gas. One MMBTU is equal to one million British Thermal Units (BTU)).

187 Center for Climate and Energy Solutions, *supra* note 170, at 14.

188 *Id.* at 16.

189 *Id.*

190 *Id.*

191 *Id.*

192 *Id.*

193 *Id.*

194 Clifford Krauss, *Boom in American Liquefied Natural Gas Is Shaking Up the Energy World*, N.Y. TIMES: ENERGY & ENV'T (Oct. 16, 2017), https://www.nytimes.com/2017/10/16/business/energy-environment/liquified-natural-gas-world-markets.html?_r=0.

195 *Id.*

196 *Id.*

C. Role of the States

Cities and states are not new to playing an active role in combating climate change.¹⁹⁷ By 2006, every state had taken steps to address climate change in some fashion.¹⁹⁸ In an address to the China General Chamber of Commerce, former mayor of New York City, Michael Bloomberg said, “We will meet the pledges that the U.S. made in Paris. The reason is simple: Cities, businesses and citizens will continue reducing emissions, because they have concluded...that doing so is in their own self-interest.”¹⁹⁹ Historically, state and city efforts have generally focused on electrical power generation, and transportation, as these sectors allow for the use of different regulatory mechanisms.²⁰⁰ For example, power generation and distribution is already regulated by public utility laws with only a handful of point sources of pollution.²⁰¹ Additionally, the market largely controls transportation options, and currently, gasoline is the only primary source of fuel for consumption on an industrial scale.²⁰² However, today, states and cities have pledged to play a greater role by cutting their GHG emissions, increasing the use of renewable sources, and adopting policies and investing in technology that mitigates climate change.²⁰³

1. California

The State of California is the United States’ leader in combating climate change with legislation aimed at reducing GHG emissions from automobiles, trucks and electrical generators, as well as a mandate to reach 1990 emission levels by the end of the decade.²⁰⁴ While the contributions of one state may seem trivial in the face of the scope of the problem, California would actually rank as the sixth largest economy in the world, as a measurement of Gross Domestic Product, ahead of France, India, Brazil and Australia.²⁰⁵ For over 50 years, California has been focused on climate change with its seminal law signed in 2006, California’s Global Warming Solutions Act of 2006 (AB

¹⁹⁷ Forman, *supra* note 163.

¹⁹⁸ Daniel Farber, *Climate Change: A U.S. Perspective*, 2 YONSEI L. J. 5 (2011).

¹⁹⁹ Bloomberg, *supra* note 157.

²⁰⁰ Farber, *supra* note 198, at 7.

²⁰¹ *Id.*

²⁰² *Id.*

²⁰³ Forman, *supra* note 163.

²⁰⁴ Farber, *supra* note 198, at 5.

²⁰⁵ Chris Nichols, *California: 6th largest economy in world and one of the highest poverty rates in nation?*, POLITIFACT (June 22, 2017, 4:40PM), <http://www.politifact.com/california/statements/2017/jun/22/antonio-villaraigosa/does-california-have-6th-largest-economy-world-and/>.

32). AB 32 mandates “the California Air Resources Board (CA Board) to set limits to reduce the state’s GHG emissions to 1990 levels by the year 2020.”²⁰⁶ The plan is centered around a cap-and-trade program, which set a limit on carbon pollution, while still providing cost-effective options for businesses to meet their GHG requirements.²⁰⁷ Furthermore, the CA Board developed early action measures, which officially went into effect on January 1st, 2010. The relevant early action measures include: (1) establishing a low-carbon fuel standard to reduce GHG emissions from the transportation sector by 10 percent by 2020; (2) reducing emissions of automotive refrigerants; (3) increasing capture of methane from landfills; (4) establishing efficiency standards for heavy-duty tractors and trailers and; (5) reducing diesel emission from ports.²⁰⁸ More recently, California reaffirmed the state’s commitment to transition to a clean energy economy with the passage of the Clean Energy & Pollution Reduction Act (SB 350) in 2015.²⁰⁹ “The legislation requires the state to increase its renewable energy mix to 50 percent and double the energy efficiency of existing buildings by 2030.”²¹⁰

Ten years after passing the historical AB 32, California strengthened the limit on GHG emissions with the passage of SB 32.²¹¹ SB 32 raised the goal for GHG emissions to 40 percent below 1990 levels by 2030.²¹² In order to reach these goals, the California Air Resources Board released a plan that continues to shift the state economy from dependence on fossil fuels to a sustainable future.²¹³ The plan calls for an extension of the state’s cap-and-trade program, low-carbon fuel standard, and regulations requiring additional low-emission vehicles.²¹⁴ Furthermore, the plan will add 4.2 million zero-emission vehicles in the state, and implement a 20 percent

²⁰⁶ Erwin Chemerinsky et al., *California, Climate Change, and the Constitution*, 37 ENVTL. L. REP. 10053, 10053 (2007).

²⁰⁷ Erica Morehouse, *California’s ambitious new climate commitments follow 10 years of success*, ENV. DEF. FUND BLOG (Sept. 1, 2016), http://blogs.edf.org/climatetalks/2016/09/01/californias-ambitious-new-climate-commitments-follow-10-years-of-success/?_ga=2.55250344.2009019769.1514996470-1905306518.1514996470.

²⁰⁸ Cal. Exec. Order No. S-01-07 (Jan. 18, 2007), <http://www.arb.ca.gov/fuels/lcfs/eos0107.pdf>, archived at <http://perma.cc/9GB2-R2T3>.

²⁰⁹ Environmental Defense Fund, *California leads fight to curb climate change*, <https://www.edf.org/climate/california-leads-fight-curb-climate-change> (last visited Jan. 3, 2017).

²¹⁰ *Id.*

²¹¹ *Id.*

²¹² *Id.*

²¹³ Alejandro Lazo, *California Aims for 40% Reduction in Greenhouse Gases by 2030*, WALL ST. J. (Jan. 20, 2017), <https://www.wsj.com/articles/california-aims-for-40-reduction-in-greenhouse-gases-by-2030-1484966197#print>.

²¹⁴ *Id.*

reduction of GHGs from the state's refineries.²¹⁵ To accomplish this goal, the state has incentivized the purchase of eco-friendly electric vehicles by increasing rebates and adding more vehicle charging stations.²¹⁶ Currently, California is ahead of schedule in meeting the 2020 targets.²¹⁷ As a result, regulators expect that in 2020 California will exceed its own requirements by an amount that is "equivalent to taking 3.3 coal burning power plants off-line for one year."²¹⁸

In addition to being ahead of schedule, California is showing the world that carbon reductions can be economically beneficial.²¹⁹ Historically, economic growth has been accompanied by a corresponding increase in emissions; however, California is charting a different course, as the state's Gross State Product has increased steadily while emissions have continued to fall.²²⁰ The state's success has attracted numerous partners, which culminated in the showcase of a global Memorandum of Understanding (MOU) at the end of the Paris negotiations in 2015.²²¹ This MOU brought together over 100 states, provinces and cities, representing a quarter of the world economy, who pledged to "reduc[e] greenhouse gas emission to at least 80 [percent] below 1990 levels by 2050, or to less than 2 metrics tons per capita by 2050."²²² Finally, California is also working directly with Canada to implement a joint cap-and-trade program, while simultaneously sharing information with China and Mexico on carbon pricing.²²³

Although California's success has been nothing short of the gold standard, it is worth noting that the Trump Administration could potentially undermine California's climate policies.²²⁴ For example, the Trump Administration could slash funding to the state's large research community. Any loss of funding would effectively inhibit the continued development of climate science and energy research.²²⁵ Furthermore, the administration could simply nullify California's regulations on air emissions and fuel

215 *Id.*

216 Forman, *supra* note 163, at 2.

217 Morehouse, *supra* note 207.

218 *Id.*

219 *Id.*

220 *Id.*

221 *Id.*

222 *Id.*

223 *Id.*

224 Adam Nagourney & Henry Fountain, *California, at the Forefront of Climate Fight, Won't Back Down to Trump*, N.Y. TIMES: U.S. (Dec. 26, 2016), <https://www.nytimes.com/2016/12/26/us/california-climate-change-jerry-brown-donald-trump.html>.

225 *Id.*

standards.²²⁶ The Trump Administration has already taken the first steps by seeking to revoke California's Clean Air Act waiver.²²⁷ The Administration's proposed revision to Obama-era standards would revoke California's authority to self-regulate and erase the mandate for electric car sales, and instead will cap the federal-fuel economy standards at the 2020 level. This is of particular significance because 12 other states now follow California's fuel emissions standards, which has effectively created a coalition of states that comprises over 130 million citizens and a third of the domestic automobile market.²²⁸ As the de facto leader of this 13 state "coalition," California effectively possesses a significant amount of leverage over the federal government making any political effort to weaken their current fuel standards an uphill battle, and one that will end up in the courts.²²⁹

2. United States Climate Alliance

The United States Climate Alliance (the "Alliance") is a bipartisan response to the federal government's decision to withdraw the U.S. from the Paris Agreement.²³⁰ The coalition, made up of 14 states, and Puerto Rico, is committed to upholding the objectives of the Paris Agreement within their borders or exceeding the targets of the federal Clean Power Plan.²³¹ Together, Alliance members account for "40 percent of U.S. GDP, at least \$7 trillion dollars of combined economic activity, and 1.3 million clean energy jobs."²³² The Alliance members are leading the nation in fighting climate change across the power, buildings and transportation sectors.²³³

Alliance members are combating climate change in the power sector through the use of multiple mechanisms. First, all Alliance members have renewable portfolio standards in place.²³⁴ These standards mandate utilities

²²⁶ *Id.*

²²⁷ Ryan Beene et al., *Trump moves forward to end California's authority to set clean-air standards, mandate electric-car sales*, LOS ANGELES TIMES: BUSINESS (July 23, 2018), <http://www.latimes.com/business/la-fi-trump-california-clean-air-20180723-story.html#>.

²²⁸ Hiroko Tabuchi, *U.S. Climate Change Policy: Made in California*, N.Y. TIMES: CLIMATE (Sept. 27, 2017), <https://www.nytimes.com/2017/09/27/climate/california-climate-change.html>.

²²⁹ Nagourney & Fountain, *supra* note 224.

²³⁰ U.S. Climate Alliance, *States United For Climate Action*, <https://www.usclimatealliance.org/#about-section> (last visited Jan. 5, 2017).

²³¹ *Id.*

²³² U.S. Climate Alliance, *2017 Annual Report: Alliance States Take the Lead*, U.S. CLIMATE ALL. 1, 3 (2017), https://static1.squarespace.com/static/5a4cfbfe18b27d4da21c9361/t/5a5e7f169140b79e6fe04f50/1516142359401/USCA_Climate_Report-V2A-Online-RGB.PDF.

²³³ *Id.*

²³⁴ *Id.*

to sell a specific percentage of renewable energy, and directly facilitate the nation's \$44 billion market for renewable energy.²³⁵ Additionally, Alliance members have attracted nearly \$100 billion in renewable energy investment since 2011, and now collectively generate more than half the Alliance's electricity from carbon neutral sources.²³⁶ In the buildings sector, Alliance members lead the country in ambitious energy codes and standards, and member states contain 45 percent of Leadership in Energy and Environmental Design certified green buildings within their borders.²³⁷ Finally, in the transportation sector, Alliance states accounted for over 70 percent of the zero emission vehicles sold nation-wide in 2016.²³⁸ The Alliance is an example of a successful multi-faceted partnership that brings together many states, cities and localities. Between 2005 and 2015, Alliance states collectively reduced net GHG emission at a rate that was 5 percent greater than the rest of the country.²³⁹ Furthermore, these states did not sacrifice economic growth. During that same time period, the combined economic output of Alliance states outpaced the rest of the country by two percent, and the Alliance states expanded twice as fast as the rest of the country, when compared on a per capita basis.²⁴⁰ The efforts by Alliance states are further proof that combating climate change does not mean sacrificing economic development. Building on a successful track record, Alliance states are now driving new clean energy jobs, energy efficiency and economic growth. Under the current policies, Alliance states are projected to meet their Paris Agreement goals and achieve a combined 24-29 percent reduction below 2005 levels by 2025.²⁴¹

D. *The World Stage is Set*

While United States actors continue to help combat climate change, the lack of visible federal leadership on the global stage is a cause for concern. As countries continue to approach climate change, there is the distinct possibility for divergence. For example, Ranping Song, an expert on climate policies, points out that "China [sees] climate change as an opportunity."²⁴²

²³⁵ Jocelyn Durkay, *State Renewable Portfolio Standards and Goals*, NSCL (Aug. 1, 2017), <http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>.

²³⁶ U.S. Climate Alliance, *supra* note 230.

²³⁷ *Id.*

²³⁸ *Id.*

²³⁹ *Id.* at 6.

²⁴⁰ *Id.*

²⁴¹ *Id.*

²⁴² John Upton, *China, India Become Climate Leaders as West Falters*, CLIMATECENTRAL (Apr. 24, 2017), <http://www.climatecentral.org/news/china-india-climate-leaders-west-falters-21377>.

This is almost the opposite of the U.S., which has gone from being a global champion on climate change to advocating for renewed use of fossil fuels.²⁴³ As a result, it appears that the world is primed for a shift in global power.

According to the Podobnik Theory, there are three dynamics necessary for a shift in global power.²⁴⁴ They are: (1) geopolitical rivalry, (2) commercial competition, and (3) social conflict.²⁴⁵ Given the unsustainable global reliance on fossil fuels, economic competition between China and the United States, and social conflict in the form of anthropogenic climate change, the stage is set for a global energy system transition.

VI. THE PEOPLE'S REPUBLIC OF CHINA

A. *The New Ambition*

The People's Republic of China (China) is successfully capitalizing on the leadership vacuum created by President Trump's withdrawal of the United States from the Paris Agreement.²⁴⁶ China's new ambition is to bypass the United States and become the global leader in clean energy.²⁴⁷ If successful, China would win the economic and diplomatic spoils that the United States and some EU countries have long enjoyed.²⁴⁸ As the U.S. retreats on the global stage, China is focusing on reshaping the renewable energy sector, and their expertise will form the infrastructure backbone for countries needing to meet their climate goals.²⁴⁹ This was no more evident than by the fact that China made a record \$32 billion in overseas renewable energy investment deals in 2016.²⁵⁰

²⁴³ *Id.*

²⁴⁴ See BRUCE PODOBNIK, *GLOBAL ENERGY SHIFTS: FOSTERING SUSTAINABILITY IN A TURBULENT AGE* 1-240 (2006).

²⁴⁵ See *id.*

²⁴⁶ Keith Bradsher, *China Looks to Capitalize on Clean Energy as U.S. Retreats*, N.Y. TIMES: BUSINESS DAY (June 5, 2017), <https://www.nytimes.com/2017/06/05/business/energy-environment/china-clean-energy-coal-pollution.html>.

²⁴⁷ *Id.*

²⁴⁸ *Id.*

²⁴⁹ *Id.*

²⁵⁰ Institute for Energy Economic and Financial Analysis, *IEEFA Report: China Set to Dominate U.S. in Global Renewables Boom; \$32 Billion in Overseas Investments in 2016 Alone*, INST. FOR ENERGY ECON. & FIN. ANALYSIS (Jan. 6, 2017), <http://ieefa.org/ieefa-report-china-set-dominate-%E2%80%A8global-renewable-energy-boom-expands-lead-u-s/>.

1. How Did China Bypass the United States?

Between 2015 and 2021, it is predicted that China will install 36 percent of all global solar energy and 40 percent of all wind energy.²⁵¹ Currently, five of the world's six largest solar-module manufacturing firms are located in China, and in a time when U.S. solar firms are recalling global staff, China is building yet another billion dollar solar module facility.²⁵² Finally, China also boasts the world's largest wind-turbine manufacturer.²⁵³ China has positioned itself on the cusp of renewable energy global dominance through a unique approach to foreign direct investment (FDI) that directly differed from its East Asian neighbors, such as Japan, Korea, and Taiwan.²⁵⁴ Further, unlike political leaders in Europe or the U.S., China does not link moral duty with climate action.²⁵⁵ Rather, China will employ global climate leadership to pursue their immediate goals of national economic development, control of energy infrastructure, and to increase the global economic competitiveness of Chinese industry.²⁵⁶ China's current dominance of the global renewables sector can be traced back to their acceptance into the World Trade Organization (WTO) in 2001.²⁵⁷

Since the early-to-mid 2000s, China has permitted expansive FDI to structure international competition in ways that allow China to gain access to foreign technology, increase the national technology base, encourage indigenous technology and production capacity, and promote domestic industry.²⁵⁸ By exercising this strategy, China manages to retain political control and regulatory capacity and to modernize, and transform its economic system through international integration.²⁵⁹ China has successfully used this pattern of courting FDI, absorbing the technology, and then adding value to shape the development of its wind and solar energy industries.

²⁵¹ Tim Buckley & Simon Nicholas, *China's Global Renewable Energy Expansion*, INST. FOR ENERGY ECON. & FIN. ANALYSIS 1, 2 (2017), http://ieefa.org/wp-content/uploads/2017/01/Chinas-Global-Renewable-Energy-Expansion_January-2017.pdf.

²⁵² *Id.*

²⁵³ *Id.*

²⁵⁴ Roselyn Hsueh, *Why is China suddenly leading the climate change effort? It's a business decision*, WASHINGTON POST (June 23, 2017), https://www.washingtonpost.com/news/monkey-cage/wp/2017/06/22/why-is-china-suddenly-leading-the-climate-change-effort-its-a-business-decision/?utm_term=.8d18d2e1c673.

²⁵⁵ ROSELYN HSUEH, CHINA'S REGULATORY STATE: A NEW STRATEGY FOR GLOBALIZATION 18-25 (2011).

²⁵⁶ HSUEH, *supra* note 254.

²⁵⁷ *Id.*

²⁵⁸ HSUEH, *supra* note 254, at 19-21.

²⁵⁹ *Id.*

For example, from 2001-2005, the Chinese government successfully attracted foreign direct investment for renewable energy through the introduction of concessions such as the Wind Power Concession (WRC). The WRC was an effort to lower the cost of large-scale industrial wind farms through competition.²⁶⁰ The basic concept was to spur international private sector investment by providing incentives and government subsidies for developers.²⁶¹ Additionally, China mandated that foreign developers form joint ventures with Chinese partners, which helped increase Chinese technical expertise, and systematize technical standards for the domestic market.²⁶² Once investment and market opportunities were created, the Chinese government re-regulated to promote indigenous energy production.²⁶³ In strategic sectors like renewable energy, China centralized control of the industry and strictly managed the level and direction of FDI.²⁶⁴ This was witnessed in 2005 when China's National Development and Reform Commission increased the local content requirement²⁶⁵ to 70 percent for all wind turbines installed in China.²⁶⁶ As a result, foreign companies constructed factories, and instructed Chinese employees on how to create, build and construct propellers and electronic controls.²⁶⁷ By the time that China faced a WTO challenge over the requirements they had already dropped the restrictions, but foreign wind producers domestic inputs had already far exceeded the former requirement of 70 percent.²⁶⁸ Similar strategies have been observed in the solar industry where state-owned companies like Xinjiang Goldwind Science & Technology Co. Ltd. (Goldwind) and Ming Yang began as domestic supply chains before emerging as top ten solar producers after purchasing Western technology, or creating foreign partnerships.²⁶⁹ Through policy support and improvement in manufacturing standards, the Chinese government has been encouraging more Chinese companies to invest in renewable projects.

²⁶⁰ National Renewable Energy Laboratory, *Renewable Energy in China: Grid Connected Wind Power in China*, U.S. DEP'T OF ENERGY 1,2 (Apr. 2004), <https://www.nrel.gov/docs/fy04osti/35789.pdf>.

²⁶¹ R.K. Raufer & S.J. Wang, *Wind Resource Concession Approach in China*, 22 IEEE POWER ENG'G. REV. 12, 12 (2002).

²⁶² HSUEH, *supra* note 254.

²⁶³ *Id.*

²⁶⁴ *Id.*

²⁶⁵ World Trade Organization, *Agreements on Trade Related Investment Measures*, https://www.wto.org/english/tratop_e/invest_e/invest_info_e.htm (last visited Jan. 16, 2018) (local content requirements require the purchase of certain products from domestic sources).

²⁶⁶ HSUEH, *supra* note 254.

²⁶⁷ *Id.*

²⁶⁸ *Id.*

²⁶⁹ *Id.*

Through myriad investment programs, China has created a renewable energy environment that will drive countries to buy from Chinese companies, giving China an economic edge.²⁷⁰ China is actively pursuing a “Going Global” strategy in conjunction with its “Made in China 2025” and “One Belt, One Road” programs.²⁷¹ The “Made in China 2025” program calls for significant spending on clean-energy research and development as a means to bolster the economy. Accordingly, state-owned banks are pouring in hundreds of millions of dollars each year into technologies like solar and wind.²⁷² In 2016, China’s government spent nearly \$1 billion more in renewable energy research and development than that of the United States.²⁷³ The “One Belt, One Road” program is a global policy, which aims to nurture economic ties with Asia, the Middle East, East Africa and Eastern Europe through infrastructure building in the form of clean-energy projects.²⁷⁴ China is investing more money in overseas renewables than any other country in the world.²⁷⁵ Increasingly, Chinese companies are taking the lead in global renewable energy value chains, and the State Grid Corporation of China (SGCC) has planned to develop an energy grid that draws on renewable energy from around the world.²⁷⁶

2. Chinese Major Players

China will be able to make over a third of all wind and solar energy investments between 2015-2021 because of their state-owned major players.²⁷⁷ China already has an impressive number of state-owned major players that hold significant presence and influence on renewable energy

²⁷⁰ Keith Bradsher, *China Looks to Capitalize on Clean Energy as U.S. Retreats*, N.Y. TIMES: BUSINESS DAY (June 5, 2017), <https://www.nytimes.com/2017/06/05/business/energy-environment/china-clean-energy-coal-pollution.html>.

²⁷¹ Buckley & Nicholas, *supra* note 251, at 1.

²⁷² *See id.*

²⁷³ Angus McCrone et al., *Global Trends In Renewable Energy Investment 2017*, FRANKFURT SCH. – UNEP COLLABORATING CENTRE FOR CLIMATE & SUSTAINABLE ENERGY FIN. 1, 23-26 (2017), <http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2017.pdf>.

²⁷⁴ *See* Jocelyn Timperley, *China leading on world’s clean energy investment, says report*, CARBONBRIEF: INTERNATIONAL POL’Y (Jan. 9, 2018, 7:53 PM), <https://www.carbonbrief.org/china-leading-worlds-clean-energy-investment-says-report>; *see also* Criselda Diala-McBride, *OBOR and the future of energy trade*, ENIDAY, https://www.eniday.com/en/sparks_en/obor-china-global-energy-map/ (last visited Feb. 2, 2018).

²⁷⁵ Jiang Kejun & Jonathan Woeztzel, *How China is leading the renewable energy revolution*, WORLD ECON. FORUM (Aug. 29, 2017), <https://www.weforum.org/agenda/2017/08/how-china-is-leading-the-renewable-energy-revolution>.

²⁷⁶ *Id.*

²⁷⁷ Buckley & Nicholas, *supra* note 251, at 2.

investment around the world.²⁷⁸ The SGCC, second on the 2016 Global Fortune 500 list, is the world's largest electricity utility company serving more than one billion customers.²⁷⁹ The SGCC is wholly owned by government of China, and has annual revenue larger than that of Boeing and Apple combined.²⁸⁰ The SGCC has a significant presence in Australia, Brazil, Italy, Portugal, Greece and the Philippines, and plans to expand into South America, Africa and Asia.²⁸¹ Its global vision is for the creation of a borderless network of transmission lines that can carry electricity between countries allowing for the transition of energy from areas with high renewables sources to those with energy demand.²⁸² Additionally, Goldwind is the largest wind turbine manufacturing company in the world.²⁸³ Owned in part by the state-owned China Three Gorges Corporation, Goldwind has a presence across the U.S., Australia, Panama, Romania, Pakistan, Thailand, Ecuador and Chile.²⁸⁴ Goldwind is rapidly progressing to be the global leader in both wind turbine supply and installation, and seeks to become the leading international provider in clean energy and clean energy solutions.²⁸⁵ For example, under the "One Belt, One Road" program, Goldwind built on its initial successes in Pakistan, and now holds the rights to construct over one-third of all the planned wind energy projects in the country.²⁸⁶

In the solar energy sector, China has multiple solar power companies that are annually in the top six in the world in terms of size and business.²⁸⁷ For example, in 2016, Jinko Solar (JKS) became the world's largest solar module supplier.²⁸⁸ Like many other successful Chinese renewable energy companies, JKS has been effective in expanding across multiple geographies creating a large diversified customer base.²⁸⁹ This has allowed JKS to become the world leader in solar module production by leveraging its innovate products into brand recognition and robust sales.²⁹⁰ JKS has manufacturing plants in Malaysia, South Africa and Portugal, and claims to

²⁷⁸ *Id.* at 9.

²⁷⁹ *Id.*

²⁸⁰ *Id.*

²⁸¹ *Id.*

²⁸² *Id.*

²⁸³ *Id.* at 20.

²⁸⁴ *Id.*

²⁸⁵ *Id.*

²⁸⁶ *Id.*

²⁸⁷ *See id.* at 22-25.

²⁸⁸ Joshua S. Hill, *Jinko Solar Surpasses Trina Solar As World's Leading Solar PV Module Suppler In 2016*, CLEAN TECHNICA (Feb. 15, 2017), <https://cleantechnica.com/2017/02/15/jinko-solar-surpasses-trina-solar-worlds-leading-solar-pv-module-supplier-2016/>.

²⁸⁹ *Id.*

²⁹⁰ *Id.*

have the number one market share in Chile, Mexico, Brazil, South Africa and Italy.²⁹¹ “These trends suggest that China will be a major source of...cutting-edge technology implying that it will have a unique opportunity to provide global leadership.”²⁹² China understands that climate change presents a huge business opportunity. Over the past decade, China has been diligently leveraging its domestic growth in renewable energy in order to accelerate its global footprint.²⁹³ China’s experience in reducing energy intensity at home will serve as a blueprint for developing countries working towards meeting their Paris Agreement obligations.²⁹⁴ Just as the U.S. was unrivaled in the advent of the gas and oil age, China is shaping up to have a similar hold on the renewable energy leadership today.²⁹⁵

B. Spoils of Renewable Energy Leadership and the Sector

China is set to reap the spoils from a renewable energy sector that had global new investment of \$241.6 billion in 2016.²⁹⁶ The most obvious benefit is environmental. China has recognized the continued environmental degradation of the country and doesn’t want polluted air or food and water shortages. Additionally, besides environmental benefits, China will see increased jobs and other economic benefits. As the renewable energy industry is relatively labor intensive, more jobs are created for each unit of electricity generated from renewable sources than from fossil fuels.²⁹⁷ According to the International Energy Agency, in 2016, China held 3.5 million of the 8.1 million global renewable energy jobs.²⁹⁸ Finally, and most importantly to China, are the geopolitical benefits. As the global leader in renewable energy, China will have significant leverage to shape the rules of global trade for their own benefit.²⁹⁹ China will become the leading global partner for countries looking to increase renewable energy supply. China’s technological expertise will make China, not the U.S., the primary energy

291 *Id.*

292 Kejun & Woeztzel, *supra* note 275.

293 Institute for Energy Economic and Financial Analysis, *supra* note 250.

294 Kejun & Woeztzel, *supra* note 275.

295 Institute for Energy Economic and Financial Analysis, *supra* note 250.

296 Angus McCrone et al., *supra* note 273, at 11.

297 Union of Concerned Scientists, *Benefits of Renewable Energy Use*, <https://www.ucsusa.org/clean-energy/renewable-energy/public-benefits-of-renewable-power#.Wm3pFSOZNp8> (last visited on Jan. 28, 2017).

298 Buckley & Nicholas, *supra* note 251, at 3.

299 Chris G. Pope, *Is China’s dominance of Green Energy Markets a path to Global Dominance?*, INFORMED COMMENT (Jan. 13, 2018), <https://www.juancole.com/2018/01/chinas-dominance-markets.html>.

partner of choice for many nations looking to meet their Paris obligations.³⁰⁰ Through investment or trade agreements, China will have the opportunity to provide an alternative vision for international integration of renewable energy. This potential Chinese led vision, and the continued increase of the global market share of renewable energy will only further serve to legitimize China's international leadership.³⁰¹ As a result, the world could see a new Chinese led energy system emerge greatly extending China's influence on the global political economy at the expense of the United States.³⁰²

VII. COUNTERING CHINA'S GLOBAL INFLUENCE

If the U.S. is serious about stimulating job growth and the manufacturing industry, the clean energy sector is not one that the country should turn away from.³⁰³ In order to counter the rise of China, the U.S. needs to continue to innovate and advance in other renewable energy related fields, such as electricity storage and electric vehicles. These two examples are directly interconnected to the production of renewable energy and given their importance on the overall clean energy market, the U.S.' success in these fields could help to regain some of the clout lost by President Trump's withdrawal from the Paris Agreement. Electricity storage can help to bridge both temporal and geographical gaps between renewable energy supply and demand.³⁰⁴ Experts across the renewable energy sector view electricity storage as a potential game changer for efficiently using electricity created by renewable sources.³⁰⁵ Battery use is expected to increase significantly over the next few years, with the largest markets in North America, as batteries will play a key role in the integration of renewables into existing electrical grids.³⁰⁶ Furthermore, electric vehicles continue to make gains within global and domestic markets. As batteries continue to improve, and charging stations become more prevalent, consumers have more options than ever.³⁰⁷ Companies like Tesla are keeping American manufacturing and production on the map by producing electric vehicles designed from scratch,

³⁰⁰ Bradsher, *supra* note 270.

³⁰¹ Pope, *supra* note 299.

³⁰² *Id.*

³⁰³ Institute for Energy Economic and Financial Analysis, *supra* note 250.

³⁰⁴ International Renewable Energy Agency, *REthinking Energy 2017*, IRENA 1, 75 (2017), http://www.irena.org/DocumentDownloads/Publications/IRENA_REthinking_Energy_2017.pdf.

³⁰⁵ *Id.*

³⁰⁶ *Id.*

³⁰⁷ Union of Concerned Scientists, *The Importance of Both Battery Electric and Hydrogen Fuel Cell Electric Vehicles*, 1, 1-4, <https://www.ucsusa.org/sites/default/files/attach/2014/11/importance-bev-hfcev-fact-sheet.pdf> (last visited on Jan. 28, 2017).

which makes for better interior packaging and more passenger space.³⁰⁸ In July 2018, Tesla successfully achieved a production rate of 5,000 model 3 vehicles per week.³⁰⁹ By continuing to stay the leader in the fields of electricity storage and electric vehicles, actors within the U.S. can help to mitigate the detrimental impacts of President Trump's withdrawal from the Paris Agreement.

VIII. CONCLUSION

In the context of the Paris Agreement, this writing examines one potential geopolitical impact created by the Trump Administration's withdrawal of the U.S. from the Agreement. While non-federal U.S. actors are working on many fronts to combat climate change, the U.S. is still lacking federal leadership on the global scale. This vacuum has created an opportunity to allow for China to challenge the U.S.'s energy dominance. This writing demonstrates how China was able to leverage foreign direct investment into global renewable energy success.

Furthermore, while the Trump Administration pushes fossil fuels, China, using a business strategy, has positioned itself to capitalize on the socioeconomic benefits that will flow from being the global leader in renewable energy. Outside of the environmental and job benefits, China has positioned itself to have the opportunity to use its significant leverage to reshape the future of energy in a Chinese led vision. This should be deeply concerning to the United States, as the U.S. has long enjoyed the undisturbed spoils of the gas and oil age. In order to continue to be a technological leader, the U.S. private sector must continue to develop innovative technology in the fields of electricity storage and electric vehicles. By continuing to innovate, the U.S. can attempt to challenge China's vision on the global stage until there is a time for the United States to reenter the Paris Agreement.

³⁰⁸ Edward Taylor, *German carmakers relying on volume to confront Tesla*, THOMPSON REUTERS (Oct. 4, 2017, 10:31 AM), <https://www.reuters.com/article/us-autos-electric-analysis/german-carmakers-relying-on-volume-to-confront-tesla-idUSKBN1C921T>.

³⁰⁹ Fred Lambert, *Tesla seems to have achieved Model 3 production rate of 5,000 units as employees celebrate (TSLA)*, ELECTREK (July 1, 2018), <https://electrek.co/2018/07/01/tesla-model-3-production-rate-5000-units-employees-celebrate/>.